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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

NGUYEN, TU MINH

ART UNIT

PAPER NUMBER

3748

MAIL DATE

DELIVERY MODE

09/18/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/541,004	Applicant(s) POTT ET AL.	
	Examiner Tu M. Nguyen	Art Unit 3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 July 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 July 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. An Applicant's Amendment filed on July 11, 2007 has been entered. Claims 1, 4-6, 9-13, 15, 18, 19, and 21 have been amended; and claims 22-28 have been added. Overall, claims 1-28 are pending in this application.

Drawings

2. Formal drawing of Figure 2 filed on July 11, 2007 has been approved for entry.

Claim Objections

3. Claims 19 and 28 are objected to because:
 - Claim 19, there is a lack of antecedent basis for "the at least two pre-catalysts".
 - Claim 28 is confusing because gasoline is a fuel such as unleaded gasoline and is different from diesel fuel.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office Action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-9, 13-18, 20-26, and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Farmer et al. (U.S. Patent 6,244,043).

Re claims 1 and 15, as shown in Figures 1-3, Farmer et al. disclose a lean-runnable multi-cylinder engine (10) and a method for controlling the temperature of at least one catalyst (40) arranged in an exhaust gas cleaning system of said lean-runnable multi-cylinder engine, wherein energy is introduced into the exhaust gas cleaning system by a lambda split, and the introduction of energy is limited (see step 314 and lines 52-59 of column 4) depending on:

- at least one of a catalyst temperature (desired SO_x purge trap temperature (T_{des})), exhaust gas temperature, exhaust gas mass flow rate, change of the catalyst temperature, change of the exhaust gas temperature, and change of exhaust gas mass flow rate, and
- at least one of the parameters rate of change (ΔT) of the catalyst temperature (see steps 212, 214, 216, and 312), rate of change of the exhaust gas temperature, and rate of change of the exhaust gas mass flow rate.

Re claims 2 and 16, in the method and engine of Farmer et al., the exhaust gas cleaning system includes at least two exhaust gas paths (30, 34) disposed between the multi-cylinder engine (10) and the at least one catalyst (32 or 36), wherein a predefinable lambda value (see step 314) can be applied to each of the at least two exhaust gas paths.

Re claims 3 and 17, in the method and engine of Farmer et al., the exhaust gas cleaning system has at least one main catalyst (40) with at least two upstream pre-catalysts (32, 36), wherein each pre-catalyst (32 or 36) is arranged in a corresponding exhaust gas path (30 or 34) to which a predefinable lambda value can be applied.

Re claims 4 and 22, in the method of Farmer et al., the introduction of energy is limited with increasing, measured or modeled temperature of the at least one catalyst (40), wherein the at least one catalyst (40) is the main catalyst.

Re claims 5 and 23, in the method of Farmer et al., the introduction of energy in at least one catalyst (40), is limited for a high positive time-dependent temperature gradient (if ΔT is large in step 212, the error in step 312 is small; and a feedback correction in step 314 is limited), wherein the at least one catalyst (40) is the main catalyst.

Re claims 6 and 24, in the method of Farmer et al., the introduction of energy in at least one catalyst (40), is limited when a positive time-dependent temperature gradient progressively increases (see claim 5 above), wherein the at least one catalyst (40) is the main catalyst.

Re claim 7, in the method of Farmer et al., the introduction of energy is limited when the exhaust gas mass flow decreases (see Figure 4 and line 60 of column 4 to line 6 of column 5).

Re claim 8, in the method of Farmer et al., the amount of the introduced energy is defined by a split factor (R in step 814), which is determined when introduction of energy is requested, with the split factor defining (steps 816 and 810) the lambda values of the individual exhaust gas paths in the exhaust gas cleaning device.

Re claim 9, in the method of Farmer et al., when the lambda value before the at least one catalyst, in particular the main catalyst (40), is controlled to a desired value, the lambda value in the lean exhaust gas path is controlled to the lean lambda value, which results from the required split factor, depending on the lambda value measured before and after the at least one catalyst,

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in particular the main catalyst, whereas the rich exhaust gas path is pre-controlled (see Figures 7-8 and line 66 of column 6 to line 10 of column 7).

Re claims 13, 18, and 26, in the method and engine of Farmer et al., the at least one catalyst is a NOx-storage catalyst (40), whose temperature is controlled by introduction of energy into the exhaust gas cleaning system so that the NOx-storage catalyst is desulfurized, wherein the at least one catalyst (40) is the main catalyst.

Re claim 14, in the method of Farmer et al., the introduction of energy is limited depending on the catalyst temperature (T_p), the time-dependent change of the catalyst temperature and the rate of change of the catalyst temperature (ΔT), and of the exhaust gas mass flow (see Figure 4).

Re claim 20, in the multi-cylinder engine of Farmer et al., the means comprise a control device (12), in which models and algorithms for a coordinated control of exhaust-gas-related and performance-related measures are stored in digitized form.

Re claims 21 and 28, in the multi-cylinder engine of Farmer et al., the multi-cylinder engine (10) is a gasoline engine, wherein the gasoline engine is a direct-injection gasoline engine.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 19 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farmer et al. as applied to claim 15 above, in view of legal precedent.

The multi-cylinder engine of Farmer et al. further comprises at least two pre-catalysts (32, 36). They, however, fail to disclose that a precious metal content of the at least two pre-catalysts is $\leq 2.87 \text{ g/dm}^3$.

Farmer et al. disclose the claimed invention except for specifying an optimum range of precious metal content for the two pre-catalysts being $\leq 2.87 \text{ g/dm}^3$. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a specific optimum range of precious metal content for the pre-catalysts, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

8. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farmer et al. as applied to claim 8 above, in view of applicant's admitted prior art.

The method of Farmer et al. discloses the invention as cited above, however, fails to disclose that with a very lean setting as high as $\lambda > 1.3$ on the lean exhaust gas path such that combustion instability becomes an issue, the lambda split control is temporarily interrupted, wherein at least one of the split factor is reduced and less energy is introduced.

Since applicant fails to challenge the examiner's official notice that it is well known to those with ordinary skill in the art to temporarily interrupt the lambda split control in Farmer et al. when there is a very lean setting as high as $\lambda > 1.3$ on the lean exhaust gas path such that

combustion instability becomes an issue, it is therefore assumed that applicant has acquiesced with the examiner on such feature or limitation.

Response to Arguments

9. Applicant's arguments with respect to the references applied in the previous Office Action have been fully considered but they are not persuasive.

In response to applicant's argument that Farmer et al. fail to disclose or suggest limiting an introduction of energy for a lambda split configuration depending on the rate of change of at least one of the catalyst temperature, the exhaust gas temperature, and the exhaust gas mass flow rate (page 11 of the Amendment), the examiner respectfully disagrees.

As shown in Figure 2, Farmer et al. computes a rate of change of a catalyst temperature (ΔT) in step 212 based on a current temperature value (T), a previous temperature value (T_{pre}), and a sample time ($\Delta time$). In step 216, a predicted temperature value (T_p) of the catalyst is calculated based on the computed ΔT and the current temperature (T). In a routine depicted in Figure 3, an error (e) is determined in step 314 from T_p and a desired purge temperature (T_{des}) of the catalyst. And in step 314, a feedback correction to the desired lean air-fuel ratio for lean cylinders is determined based on the error (e) so that the temperature of the catalyst does not rise beyond the desired purge temperature (T_{des}). Thus, by changing an air-fuel ratio of the lean cylinders based on a predicted temperature of the catalyst, which is computed from a rate of change of the catalyst temperature, Farmer et al. clearly limit an introduction of energy for a lambda split configuration depending on the rate of change of the catalyst temperature.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Communication

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (571) 272-4862.

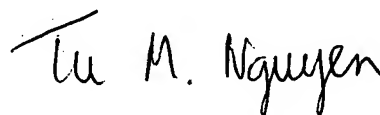
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TMN

September 14, 2007

A handwritten signature in black ink, reading "Tu M. Nguyen". The signature is written in a cursive, flowing style.

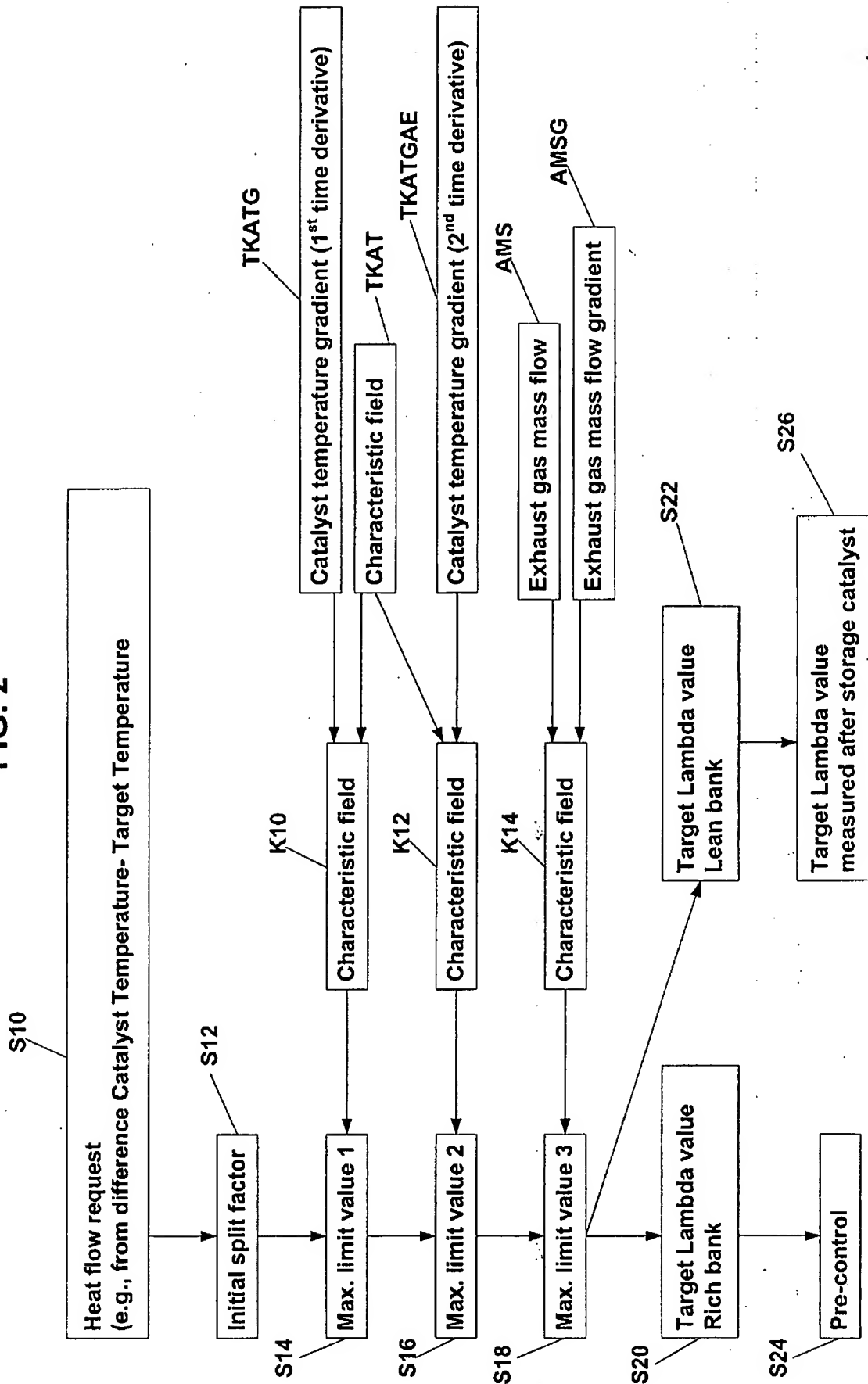
Tu M. Nguyen

Primary Examiner

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REPLACEMENT SHEET

FIG. 2



Approved for Entry
9/14/07
TMN